To Cohen and forget? Evaluation of postoperative imaging studies after transtrigonal ureteric reimplantation for vesicoureteric reflux in children

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Abstract: OBJECTIVES: To determine the clinical significance of routine postoperative voiding cystourethrography (VCUG) and renal functional studies in the postoperative management of children after a transtrigonal ureteric reimplantation. METHODS: A retrospective record review of 126 consecutive patients undergoing transtrigonal ureteric reimplantation. Inclusion criteria included primary reflux and >5 years of follow-up. Follow-up imaging studies consisted of serial renal ultrasounds (US) and one VCUG and intravenous urogram (IVU) each. RESULTS: Of 126 patients, 2 required a reoperation for contralateral reflux and pyelonephritis. In all other patients the results of the VCUG did not alter management. Dilatation seen in IVU was always visible in the renal US as well and always resolved spontaneously. No new dilatation was observed after 1 year of follow-up. CONCLUSIONS: Routine postoperative VCUG and renal functional studies are not warranted in asymptomatic patients after transtrigonal reimplantation. Only in patients with postoperative pyelonephritis did the imaging studies alter the treatment. In the majority of patients, follow-up with an early and 1-year renal US may suffice. Elimination of routine VCUG and functional studies will decrease morbidity and cost after ureteric reimplantation.

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To Cohen and Forget? Evaluation of Postoperative Imaging Studies after Transtrigonal Ureteric Reimplantation for Vesicoureteric Reflux in Children

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Key Words

Cohen transtrigonal ureteric reimplantation · Transtrigonal ureteric reimplantation · Ureteric reimplantation · Vesicoureteric reflux · Vesicoureteral reflux, reimplantation · Voiding cystourethrography

Abstract

Objectives: To determine the clinical significance of routine postoperative voiding cystourethrography (VCUG) and renal functional studies in the postoperative management of children after a transtrigonal ureteric reimplantation. ***Methods:*** A retrospective record review of 126 consecutive patients undergoing transtrigonal ureteric reimplantation. Inclusion criteria included primary reflux and >5 years of follow-up. Follow-up imaging studies consisted of serial renal ultrasounds (US) and one VCUG and intravenous urogram (IVU) each. ***Results:*** Of 126 patients, 2 required a reoperation for contralateral reflux and pyelonephritis. In all other patients the results of the VCUG did not alter management. Dilatation seen in IVU was always visible in the renal US as well and always resolved spontaneously. No new dilatation was observed after 1 year of follow-up. ***Conclusions:*** Routine postoperative VCUG and renal functional studies are not warranted in asymptomatic patients after transtrigonal reimplantation. Only in patients with postoperative pyelonephritis did the imaging studies alter the treatment. In the majority of patients, follow-up with an early and 1-year renal US may suffice. Elimination of routine VCUG and functional studies will decrease morbidity and cost after ureteric reimplantation.

Introduction

Cohen transtrigonal ureteric reimplantation for vesicoureteric reflux (VUR) without associated urological or neurological disorders has a very high success rate within the range of 95.8–99.3% [1–7]. Despite these results, most pediatric surgeons confirm the outcome of the Cohen reimplantation by postoperative voiding cystourethrographies (VCUG). In 2001, Herndon et al. [8] published a survey showing that 97% of 155 members of the American Academy of Pediatrics, Section Urology, performed a VCUG after reimplantation. Although attitudes towards postoperative studies are changing [1–6, 9], we feel that many surgeons continue to be hesitant not to confirm the absence of reflux by means of a test involving urethral catheterization.

Our aim must be to perform postoperative studies only if they can reliably detect complications and alter the management such that the outcome will be improved. However, no data have been published to confirm these

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findings in a long-term follow-up study including standardized routine imaging with a VCUG, intravenous urogram (IVU) and serial ultrasound (US) examinations in all patients. We report a series of 126 cases with long-term follow-up to retrospectively analyze which imaging studies had a clinical significance.

Methods

We reviewed 161 medical records of patients who underwent a Cohen ureteric reimplantation at our institution between 1977 and 1995. Study inclusion criteria were primary VUR in single or duplicated systems and a complete follow-up of at least 5 years. Patients with neurological anomalies or urogenital malformations other than duplications were excluded from the study. Ureters were stented for 1 week postoperatively, and suprapubic catheters were left for a further 2 days. All patients received antibiotic prophylaxis for 3 months. Routine follow-up consisted of a limited IVU after the removal of the ureteric stents and US after the removal of the suprapubic catheter. The US was repeated at 3 months. An IVU was done at 6 months and a VCUG at 12 months postoperatively. Standard long-term follow-up included patient history, clinical examination and US study after every year for the first 3 years and then every 2–3 years for at least 5 years or until the age of 16 years.

Results

Between 1977 and 1995, 161 children underwent Cohen ureteric reimplantation for primary VUR. 22 patients were lost to follow-up. 13 patients who were followed for <5 years had an uneventful postoperative course and had a mean follow-up of 4.5 years. Thus, the study population consisted of 126 patients with a regular follow-up for at least 5 years (mean 9.0, 5.04–15.49). There were 98 girls and 28 boys who were operated on in 205 renal units. Bilateral reimplantation was done in 79 children. Severity of reflux was classified according to the international grading systems of VUR [10]. Grade I reflux was found in 4 renal units (2%), grade II in 44 (21.5%), grade III in 106 (51.7%), grade IV in 41 (20%) and grade V in 10 (4.9%). Age at surgery ranged from 2.7 months to 12 years (mean age 5.1 years).

Persistent reflux was detected in seven renal units (3.4%, n = 205) in 6 patients (4.8%, n = 126) by the routine 12-month postoperative VCUG. 5 patients did not develop urinary tract infections (UTIs) after stopping the antibiotic prophylaxis and in 3 of them, spontaneous resolution was confirmed by repeat VCUG 2, 5.4 and 8.6 years postoperatively. Only 1 patient with persistent reflux in both pyelocalyceal systems of a duplicated kidney had recurrent UTIs and was reoperated 4.7 years after the initial surgery.

New contralateral reflux was detected in 7 patients (14.9%, n = 47) after unilateral ureterocystoneostomy. Despite this finding, antibiotic prophylaxis was stopped. However, 2 patients developed recurrent UTIs and were reoperated 1 respectively 3.2 years after the initial surgery. The other 5 patients remained asymptomatic.

Slight postoperative dilatation of the pyelocalyceal systems and ureters was a very common finding that was seen in 54 (43%) of our patients before discharge from the hospital. An US examination was repeated 3 months postoperatively and revealed hydronephrosis or hydroureters in 14 patients (11%). At the 6-month postoperative intravenous pyelogram (IVP), slight obstruction was confirmed in 5 of these 14 patients, the other patients showed no evidence for obstruction. 4 of these patients with early postoperative obstruction remained clinically asymptomatic and had a spontaneous resolution of the signs of obstruction in the long-term follow-up. Only 1 patient had persistent hydronephrosis due to complicated reflux and had to be reoperated because of recurrent infections. During the routine late follow-up, an average of 4.9 US studies was performed. After the first postoperative year, no worsening of an existing obstruction or signs of a new obstruction were found and no consecutive interventions were based upon these studies in asymptomatic patients.

One girl had an obstruction that was not related to the surgery: she developed severe bilateral hydronephrosis that was detected during the routine IVU 6 months postoperatively. She was reoperated for suspected prevesical obstruction due to scarring of the ureteric orifices. Intraoperatively, a dysgerminoma was found to compress both ureters.

One patient developed a late complication despite normal findings during the routine postoperative follow-up. She had flank pain and hematuria 7 years postoperatively. She was reoperated after US, and IVU demonstrated an acute obstruction of the right ureter due to a stone in the Cohen tunnel.

Discussion

In this retrospective, long-term follow-up study, routine postoperative IVUs, VCUGs and US studies have neither influenced our clinical management nor did they enable us to prevent complications after transtrigonal ureteric reimplantations. This study provides evidence

that these postoperative imaging studies are of no clinical significance after transtrigonal ureteric reimplantation in asymptomatic children.

Postoperative complications such as persistent reflux or obstruction must be anticipated after transtrigonal ureteric reimplantations. Therefore, most pediatric urologists perform routine VCUGs and some do postoperative functional studies to rule out these complications [8]. The rational for those imaging studies is based on the premise that we have a responsibility to assess the outcome of our operative intervention to prove efficacy. Yet, some authors have started to question the need for those routine investigations because the decision to reoperate complicated or contralateral reflux is always based on clinical grounds, i.e. postoperative UTIs [1–6]. Our study provides data to confirm this conclusion with patients of whom most have reached the age of 16 years with a long-term follow-up of 5.04–15.49 years (mean 9.04). In contrast to other studies, we have also included patients who had unilateral reimplantation. Our data do not allow to answer the question of whether routine bilateral reimplantation should be done in unilateral VUR, but we contribute data to confirm that even after unilateral reimplantation, routine VCUG can be omitted safely.

Early postoperative obstruction of reimplanted ureters is a rare but significant complication, because it endangers the kidney's functional capacity. Some authors have therefore advocated performing functional postoperative studies, be it IVP or scintigraphy [8]. In our study, an IVP was performed 6 months postoperatively in all patients, demonstrating hydronephrosis in 3.9%, which disappeared spontaneously in all but 1 patient. This girl had an obstruction unrelated to the reimplantation. IVPs have not contributed to avoid complications or to alter a patient's management in our patients. All patients with signs of obstruction in the IVP were detected with US examinations as well. Our data confirm that functional studies are not necessary after uncomplicated ureteric reimplantation in children.

Late, chronic postoperative obstruction in children does not necessarily become symptomatic. To exclude this possible complication, we have performed regular follow-up US examinations. The long-term follow-up of 5 years with an average of 4.9 US studies per patient did not reveal worsening of preexisting dilatation of the pelvicalyceal systems or new hydronephrosis related to the reimplantation beyond the first postoperative year. On the basis of these favorable results, one may question the indication for these routine US studies beyond 1 year just as we have questioned the indication for routine IVP and VCUG [9]. Yet, we are hesitant to draw this conclusion from this relatively small series of 126 patients. If ureteric obstruction occurs in 1 per 100 cases, then the chances of completing our series without seeing an obstruction is not statistically unlikely [9, editorial comment]. Considering that US examination does not expose patients to radiation and causes very little distress to the children examined, we are more liberal in asking for this examination. Longitudinal US examinations are capable of detecting growth disturbances of the kidneys and give indirect evidence for obstruction in a functioning kidney. Long-term follow-up with US may be considered until very large prospective studies prove that they are not warranted.

Conclusion

Postoperative VCUG and functional studies after the Cohen transtrigonal repair are indicated in symptomatic patients only. Functioning kidneys at risk for postoperative obstruction can be identified with US imaging. Patients must be informed however that they should seek immediate specialist evaluation in case of clinical signs of UTIs or obstruction. There is no doubt that children with a postoperative pyelonephritis do need further investigation with VCUG to exclude complicated reflux, and reoperation must be considered. Eliminating routine postoperative VCUG and functional studies decreases the radiation exposure, avoids the discomfort of repeat catheterization and reduces the costs.

Long-term follow-up with US beyond the first postoperative year may be considered until very large prospective studies prove that they are not warranted.

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References

1 Bisignani G, Decter RM: Voiding cystoureterography after uncomplicated ureteral reimplantation in children: is it necessary? J Urol 1997;158:1229–1231.
2 Bomalaski MD, Ritchey ML, Bloom DA: What imaging studies are necessary to determine outcome after ureteroneocystostomy? J Urol 1997;158:1226–1228.
3 El-Ghoneimi A, Odet E, Lamer S, Baudouin V, Lottmann H, Aigrain Y: Cystography after the Cohen ureterovesical reimplantation: is it necessary at a training center? J Urol 1999;162:1201–1202.
4 Barrieras D, Lapointe S, Reddy PP, Williot P, McLorie GA, Bägli D, et al: Are postoperative studies justified after extravesical ureteral reimplantation? J Urol 2000;164:1064–1066.
5 Grossklaus DJ, Pope JC 4th, Adams MC, Brock JW 3rd: Is postoperative cystography necessary after ureteral reimplantation? Urology 2001;58:1041–1044.
6 Lavine MA, Siddiq FM, Cahn DJ, Caesar RE, Koyle MA, Caldamone AA: Vesicoureteral reflux after ureteroneocystostomy: indications for postoperative voiding cystography. Tech Urol 2001;7:50–54.
7 Sheldon CA, Wacksman J: Urinary tract infection and vesicoureteral reflux; in Ashcraft KW, Holder TM (eds): Pediatric Surgery, ed 2. Philadelphia, Saunders, 1993, pp 612–629.
8 Herndon CD, Ferrer FA, McKenna PH: Survey results on medical and surgical follow-up of patients with vesicoureteral reflux from American Association of Pediatrics, Section on Urology members. J Urol 2001; 165:559–563.
9 Charbonneau SG, Tackett LD, Gray EH, Caesar RE, Caldamone AA: Is long-term sonographic follow-up necessary after uncomplicated ureteral reimplantation in children? J Urol 2005;174:1429–1431.
10 Lebowitz RL, Obling H, Parkkulainen KV, Smellie JM, Tamminen-Möbius TE: International system of radiographic grading of vesicoureteric reflux. Pediatr Radiol 1985;15: 105–109.